

FIGURE 1

**FIGURE 2a. Primers used to obtain sequences high-fidelity PCR amplification of human cDNA.**

5    RAPF: GCGATAGGATCCTACTCGCGGGAGAAGAACCAGCCCAAGCCGTCCCCGA  
      RAPR: GCGATAAACCGGTTTCTGCCTCGGCGCGAGCTCTGGAGATCCTGCCGGACAGGTCCT  
  
      GAAF: GCGATAACCGGTGCACACCCCGGCCGTCCCAGAGCAGTG  
      GAAR: GCGATACTCGAGTCAACACCAGCTGACGAGAAACTGC  
10  
      IDUF: GCGATAACCGGTGAGGCCCCCGCACCTGGTGCATGTGGACGCGGC  
      IDUR: GCGATACTCGAGTCATGGATTGCCCGGGGATGGGGGCCCTCTTGG  
  
      GDNF: ACAGTGACCGGTTACCAGATAAACAATGGCA  
15    GDNR: ACAGTGCTCGAGTCTAGATCAGATACATCCACACCTTT

**FIGURE 2b. GDNF fusion, substitution of RAPF with RAPBACF in RAP amplification of GDNF construct.**

      RAPBACF: ACAGTGGCCATGGGGGGTTCTTACTCGCGGGAGAAGAACCAGCCCAAGCCG  
20

**FIGURE 3. Nucleotide and protein sequences of the RAP-GAA fusion**

cttaccgccatgcggggtccgagcggggctctgtggctgctcctggctctgcgcaccgtg  
5 ctcggatcctactcgcgggagaagaaccagcccaagccgtccccgaaacgcgagtccgga  
L G S Y S R E K N Q P K P S P K R E S G  
gaggagtccgcacatggagaagttgaaccagctgtgggagaaggcccagcgactgcattt  
E E F R M E K L N Q L W E K A Q R L H L  
cctcccgtaggctggccgagctccacgctgatctgaagatacaggagagggacgaactc  
10 P P V R L A E L H A D L K I Q E R D E L  
gcctggaagaaactaaagcttgacggcttgacgaagatggggagaaggaagcgagactc  
A W K K L K L D G L D E D G E K E A R L  
atacgcaacctcaatgtcatcttgccaagtatggctctggacggaaagaaggacgctcgg  
I R N L N V I L A K Y G L D G K K D A R  
15 caggtgaccagcaactccctcagtggtgacccaggaagacgggctggatgacccaggtg  
Q V T S N S L S G T Q E D G L D D P R L  
gaaaagctgtggcacaaggcgaagacctctgggaaattctccggcgaagaactggacaag  
E K L W H K A K T S G K F S G E E L D K  
ctctggcggtggttccctgcacacaaagagaagttcacgagtacaacgtcctgctggag  
20 L W R E F L H H K E K V H E Y N V L L E  
accctgagcaggaccgaagaatccacgagaacgtcattagcccctcggacctgagcgac  
T L S R T E E I H E N V I S P S D L S D  
atcaagggcagcgctcctgcacagcaggcacacggagctgaaggagaagctgcgcagcatc  
I K G S V L H S R H T E L K E K L R S I  
25 aaccagggcctggaccgctgcgcaggggtcagccaccagggctacagcactgaggctgag  
N Q G L D R L R R V S H Q G Y S T E A E  
ttcaggagagccaggggtgattgacctgtgggacctggcgagtcggccaacctcacggac  
F E E P R V I D L W D L A Q S A N L T D  
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aaccactaccagaagcagctggagattgcgacagagaagctgaggcacgcagagagcggtg  
N H Y Q K Q L E I A H E K L R H A E S V  
ggcgacggcgagcgtgtgagccgcagccgcgagaagcacgccctgctggagggcgaggac  
G D G E R V S R S R E K H A L L E G R T  
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K E L G Y T V K K H L Q D L S G R I S R  
gctcgcgccgagggcagaaacgggtgcacaccccgccgtccagagcagtgcccacacag  
A R A E A E T G A H P G R P R A V P T Q  
40 tgcgacgtcccccccaacagccgcttcgattgcgcccctgacaaggccatcacccaggaa  
C D V P P N S R F D C A P D K A I T Q E  
cagtgcgaggcccggtgctgtctacatccctgcaaagcaggggctgcaggagagccag  
Q C E A R G C Y I P A K Q G L Q G A Q  
atggggcagccctggtgcttcttccacccagctacccagctacaagctggagaacctg  
M G Q P W C F F P P S Y P S Y K L E N L  
45 agctcctctgaaatgggctacacggccaccctgacctgaccacccccaccttcttcccc  
S S S E M G Y T A T L T R T T P T F F P  
aaggacatcctgacctgcggctggacgtgatgatggagactgagaaccgcctccacttc  
K D I L T L R L D V M M E T E N R L H F  
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S R A P S P L Y S V E F S E E P F G V I  
gtgcaccggcagctggacggcgctgctgtaacacgacgggtggcgcccctgttcttt  
V H R Q L D G R V L L N T T V A P L F F  
55 gcggaccagttccttcagctgtccacctcgctgccctcgagtatatcacaggcctcgcc  
A D Q F L Q L S T S L P S Q Y I T G L A  
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E H L S P L M L S T S W T R I T L W N R  
gaccttgcgccacgcccgggtgcgaacctctacgggtctcaccttttctacctggcgctg  
60 D L A P T P G A N L Y G S H P F Y L A L  
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 L Q P S P A L S W R S T G G I L D V Y I  
 5 ttcctgggcccagagcccaagagcgtggtgcagcagtagctggacgttgtgggatacccg  
 F L G P E P K S V V Q Q Y L D V V G Y P  
 ttcattgccgccatactggggcctgggcttccacctgtgccgctggggctactcctccacc  
 F M P P Y W G L G F H L C R W G Y S S T  
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 A I T R Q V V E N M T R A H F P L D V Q  
 10 tggaaacgacctggactacatggactcccgaggaggacttcacgttcaacaaggatggcttc  
 W N D L D Y M D S R R D F T F N K D G F  
 cgggacttcccgccatggtgcaggagctgcaccagggcgccggcgctacatgatgatc  
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 15 gtggatcctgccatcagcagctcgggcccctgccgggagctacaggccctacgacgagggt  
 V D P A I S S S G P A G S Y R P Y D E G  
 ctgcggaggggggttttcatcaccaacgagaccggccagccgctgattgggaaggtatgg  
 L R R G V F I T N E T G Q P L I G K V W  
 cccgggtccactgccttccccgacttcaccaacccccacagccctggcctggtgggaggac  
 P G S T A F P D F T N P T A L A W W E D  
 20 atgtggctgagttccatgaccaggtgcccttcgacggcttgtggattgacatgaacgag  
 M V A E F H D Q V P F D G L W I D M N E  
 ccttccaacttcatcagaggctctgaggacggctgccccacaatgagctggagaaccca  
 P S N F I R G S E D G C P N N E L E N P  
 ccctacgtgcctgggggtggtggggggaccctccaggcgccaccatctgtgcctccagc  
 25 P Y V P G V V G G T L Q A A T I C A S S  
 caccagtttctctccacacactacaacctgcacaacctctacggcctgaccgaagccatc  
 H Q F L S T H Y N L H N L Y G L T E A I  
 gcctcccacagggcgctggtgaaggctcgggggacacgcccatttgtgatctcccgctcg  
 A S H R A L V K A R G T R P F V I S R S  
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 T F A G H G R Y A G H W T G D V W S S W  
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 V G A D V C G F L G N T S E E L C V R W  
 acccagctgggggccttctaccccttcatgcggaaccacaacagcctgctcagctctgcc  
 T Q L G A F Y P F M R N H N S L L S L P  
 caggagccgtacagcttcagcgagccggccagcaggccatgaggaaggccctcaccctg  
 Q E P Y S F S E P A Q Q A M R K A L T L  
 40 cgctacgcactcctccccacctctacacactgttccaccaggccacgtcgcgggggag  
 R Y A L L Y L P A L D T I N V H L R A G  
 accgtggcccgccctcttccctggagttcccaaggactctagcacctggactgtggac  
 T V A R P L F L E F P K D S S T W T V D  
 caccagctcctgtggggggaggccctgctcatcaccacagtgctccaggccgggaaggcc  
 45 H Q L L W G E A L L I T P V L Q A G K A  
 gaagtgactggctacttccccttgggcacatggtacgacctgcagacgggtgccaatagag  
 E V T G Y F P L G T W Y D L Q T V P I E  
 gcccttggcagcctccccccccacctgcagctccccgtgagccagccatccacagcgag  
 A L G S L P P P P A A P R E P A I H S E  
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 G Q W V T L P A P L D T I N V H L R A G  
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 Y I I P L Q G P G L T T T E S R Q Q P M  
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 55 A L A V A L T K G G E A R G E L F W D D  
 ggagagagcctggaagtgtgtggagcgaggggccctacacacaggtcatcttctggccagg  
 G E S L E V L E R G A Y T Q V I F L A R  
 aataacacgatcgtgaatgagctggtacgtgtgaccagtgagggagctggcctgcagctg  
 N N T I V N E L V R V T S E G A G L Q L  
 60 cagaaggtgactgtcctgggcgtggccacggcgccccagcaggtcctctccaacggtgtc  
 Q K V T V L G V A T A P Q Q V L S N G V

cctgtctccaacttcacctacagccccgacaccaaggtcctggacatctgtgtctcgctg  
P V S N F T Y S P D T K V L D I C V S L  
ttgatgggagagcagtttctcgtcagctggtgttgactcgag  
L M G E Q F L V S W C -

5

Melanotransferrin signal sequence is italicized. Linker peptide is underlined.

**FIGURE 4. Nucleotide and protein sequences of the RAP-IDU fusion**

aagcttaccgccatgcggggccgagcggggctctgtggctgctcctggctctgcgacc  
M R G P S G A L W L L L A L R T

5 . gtgctcggatcctactcgcgaggagaagaaccagcccaagccgtcccccgaacgcgagtc  
V L G S Y S R E K N Q P K P S P K R E S  
ggagaggagttccgcattggagaagttgaaccagctgtgggagaaggcccagcgactgcat  
G E E F R M E K L N Q L W E K A Q R L H  
cttcctcccgtaggctggccgagctccacgctgatctgaagatacaggagagggacgaa  
10 L P P V R L A E L H A D L K I Q E R D E  
ctcgctggaagaaactaaagcttgacggcttgacgaagatggggagaaggaagcgaga  
L A W K K L K L D G L D E D G E K E A R  
ctcatagcaacctcaatgtcatcttggccaagtatggtctggacggaagaaggacgct  
L I R N L N V I L A K Y G L D G K K D A  
15 cggcaggtgaccagcaactccctcagtgccaccaggaagacgggctggatgacccag  
R Q V T S N S L S G T Q E D G L D D P R  
ctggaaaagctgtggcacaaggcgaagacctctggaaattctccggcgaagaactggac  
L E K L W H K A K T S G K F S G E E L D  
aagctctggcgggagttcctgcattcacaagagaaagttcacgagtacaacgtcctgctg  
20 K L W R E F L H H K E K V H E Y N V L L  
gagacctgagcagcagaagaaatccacgagaacgctcattagcccctcgacctgagc  
E T L S R T E E I H E N V I S P S D L S  
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E F E E P R V I D L W D L A Q S A N L T  
gacaaggagctggaggcggtccgggaggagctcaagcacttcgaagccaaaatcgagaag  
30 D K E L E A F R E E L K H F E A K I E K  
cacaaccactaccagaagcagctggagattgcgacgagaagctgaggcacgcagagagc  
H N H Y Q K Q L E I A H E K L R H A E S  
gtgggacgagcgagcgtgtgagccgcagccgcgagaagcacgccctgctggaggggagg  
V G D G E R V S R S R E K H A L L E G R  
35 accaaggagctgggctacacgggtgaagaagcatctgcaggacctgtccggcaggatctcc  
T K E L G Y T V K K H L Q D L S G R I S  
agagctcgcgccgaggcagaacacgggtgaggccccgcacctgggtgcatgtggacgcggcc  
R A R A E A E T G E A P H L V H V D A A  
cgcgcgctgtggccccctcgcgcgcttctggaggagcacaggttctgcccccgctgcca  
40 R A L W P L R R F W R S T G F C P P L P  
cacagccaggctgaccagtacgtcctcagctgggaccagcagctcaacctcgccatgtg  
H S Q A D Y V L S W D Q Q L N L A Y V  
ggcgccgtccctcaccgcggcatcaagcaggtccggaccactggctgctggagcttgtc  
G A V P H R G I K Q V R T H W L L E L V  
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T T R G S T G R G L S Y N F T H L D G Y  
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L D L L R E N Q L L P G F E L M G S A S  
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50 G H F T D F E D K Q Q V F E W K D L V S  
agcctggccaggagatacatcggtaggtacggactggcgcatgtttccaagtgaacttc  
S L A R Y I G R Y G L A H V S K W N F  
gagacgtggaatgagccagaccaccagactttgacaacgtctccatgacatgcaaggc  
E T W N E P D H H D F D N V S M T M Q G  
55 ttccctgaactactacgatgcctgctcgagggtctgcgcgccgagccccgccctgagg  
F L N Y Y D A C S E G L R A A S P A L R  
ctgggaggccccggcgactccttccacacccaccgcgatccccgctgagctggggcctc  
L G G P G D S F H T P P R S P L S W G L  
ctgcgccactgccacgacggtaccaacttcttctactggggaggcgggcgctgggac  
60 L R H C H D G T N F F T G E A G V R L D

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 Y I S L H R K G A R S S I S I L E Q E K  
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 D E A D P L V G W S L P Q P W R A D V T  
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 cactgacagctgttgcgcaagccggtcctcacggccatggggctgctggcgctgctgat  
 H V Q L L R K P V L T A M G L L A L L D  
 15 gaggagcagctctgggccgaagtgtcgcagggccgggacgctcctggacagcaaccacag  
 E E Q L W A E V S Q A G T V L D S N H T  
 gtgggctcctggccagcgcacccacgccccagggcccgccgacgcctggcgcgccgcg  
 V G V L A S A H R P Q G P A D A W R A A  
 gtgctgatctacgcgagcgcagacacccgcgccccaccaaccgcagcgtcgcggtgacc  
 20 V L I Y A S D D T R A H P N R S V A V T  
 ctgcggtcgcgcgggtgcccccgcccgccgctggtctacgtcacgcgctacctggac  
 L R L R G V P P G P G L V Y V T R Y L D  
 aacgggctctcagccccgacggcgagtgcgcgccctgggcccggcccgtcttccccacg  
 N G L C S P D G E W R R L G R P V F P T  
 25 gcagagcagttccggcgcatgcgcgcggctgaggacccggtggccgcggcgccccgcccc  
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 L P A G G R L T L R P A L R L P S L L L  
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 30 V H V C A R P E K P P G Q V T R L R A L  
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 ctgtggacatacagatccagttctctcaggacggttaaggcgtacaccccggtcagcagg  
 L W T Y E I Q F S Q D G K A Y T P V S R  
 35 aagccatcgaccttaacctctttgtgttcagcccagacacaggtgctgtctctggctcc  
 K P S T F N L F V F S P D T G A V S G S  
 taccgagttcgagccctggactactgggccccgaccaggcccccttctcggaacctgtgccg  
 Y R V R A L D Y W A R P G P F S D P V P  
 tacctggaggtccctgtgccaaagagggcccccaccccgggcaatccatgactcgag  
 40 Y L E V P V P R G P P S P G N P -

Melanotransferrin signal sequence is italicized. Linker peptide is underlined.

**FIGURE 5. Nucleotide and protein sequences of the RAP-GDNF fusion**

```

atggggggttcttactcgcgaggagaagaaccagcccaagccgtccccgaaacgcgagtcc
  M G G S Y S R E K N Q P K P S P K R E S
5 ggagaggagttccgcatggagaagttgaaccagctgtgggagaaggcccagcgactgcat
  G E E F R M E K L N Q L W E K A Q R L H
cttctcccgtaggctggccgagctccacgctgatctgaagatacaggagaggagcgaa
  L P P V R L A E L H A D L K I Q E R D E
ctgcctggaagaaactaaagcttgacggcttgacgaagatggggagaaggaagcgaga
10 L A W K K L K L D G L D E D G E K E A R
ctcatagcaacctcaatgtcatcttggccaagtatggtctggacggaaagaaggacgct
  L I R N L N V I L A K Y G L D G K K D A
cggcaggtgaccagcaactccctcagtgccacccaggaagacgggctggatgacccagg
  R Q V T S N S L S G T Q E D G L D D P R
15 ctggaaaagctgtggcacaaggcgaagacctctgggaaattctccggcgaagaactggac
  L E K L W H K A K T S G K F S G E E L D
aagctctggcgggagttcctgcatacacaagagaaagttcacgagtacaacgtcctgtg
  K L W R E F L H H K E K V H E Y N V L L
gagaccctgagcaggacgaagaaatccacgagaacgctattagccccctcgacctgagc
20 E T L S R T E E I H E N V I S P S D L S
gacatcaagggcagcgctcctgcacagcaggcacacggagctgaaggagaagctgcgcagc
  D I K G S V L H S R H T E L K E K L R S
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  I N Q G L D R L R R V S H Q G Y S T E A
25 gagttcgaggagcccagggtgattgacctgtgggacctggcgagctccgccaacctcacg
  E F E E P R V I D L W D L A Q S A N L T
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  D K E L E A F R E E L K H F E A K I E K
cacaaccactaccagacgctggagattgcgacgagaagctgaggcacgcagagagc
30 H N H Y Q K Q L E I A H E K L R H A E S
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  V G D G E R V S R S R E K H A L L E G R
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  T K E L G Y T V K K H L Q D L S G R I S
35 agagctcgggcccaggcagaaacccggttcaccagataaacaatggcagtgcttcctaga
  R A R A E A E T G S P D K Q M A V L P R
agagagcggaatcggcaggtgcagctgccaaaccagagaattccagaggaaaaggtcgg
  R E R N R Q A A A A N P E N S R G K G R
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40 R G Q R G K N R G C V L T A I H L N V T
gacttgggtctgggctatgaaaccaaggaggaactgatttttaggtactgcagcggctct
  D L G L G Y E T K E E L I F R Y C S G S
tgcgatgcagctgagacaacgtacgacaaaatattgaaaaacttatccagaaatagaagg
  C D A A E T T Y D K I L K N L S R N R R
45 ctggtgagtgacaaagtagggcaggcatgttgacacccatcgcccttgatgatgacctg
  L V S D K V G Q A C C R P I A F D D D L
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  G C I -

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Linker peptide is underlined.



Figure 6. Characterization of the RAP-GAA fusion.

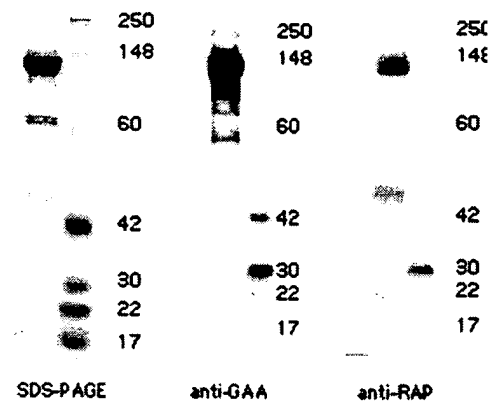


Figure 7. Assay for complex oligosaccharides on RAP-GAA

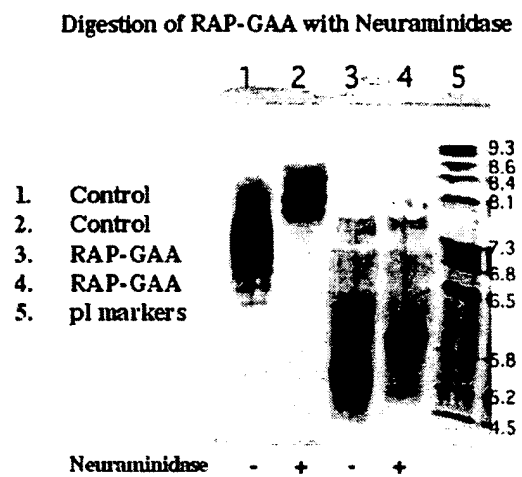


Figure 8. Assay for high-mannose oligosaccharides on RAP-GAA

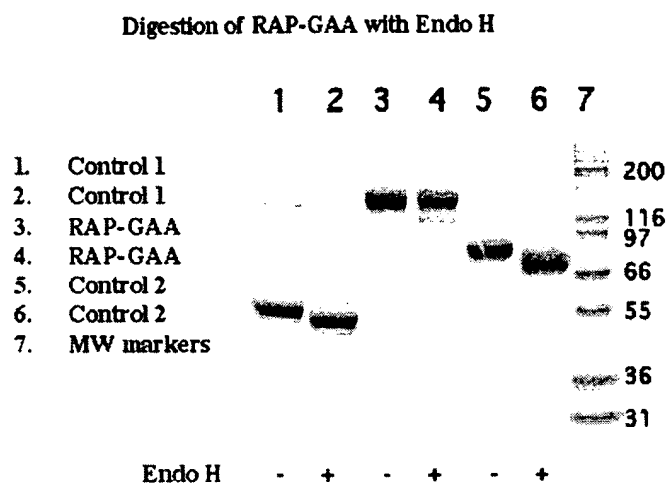
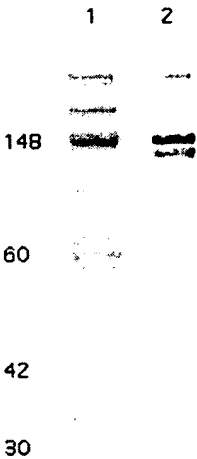


Figure 9. Characterization of RAP-IDU fusion



1. SDS-PAGE  
2. Anti-Iduronidase Western

Binding of RAP and RAP-lysosomal enzyme fusion to LRP.






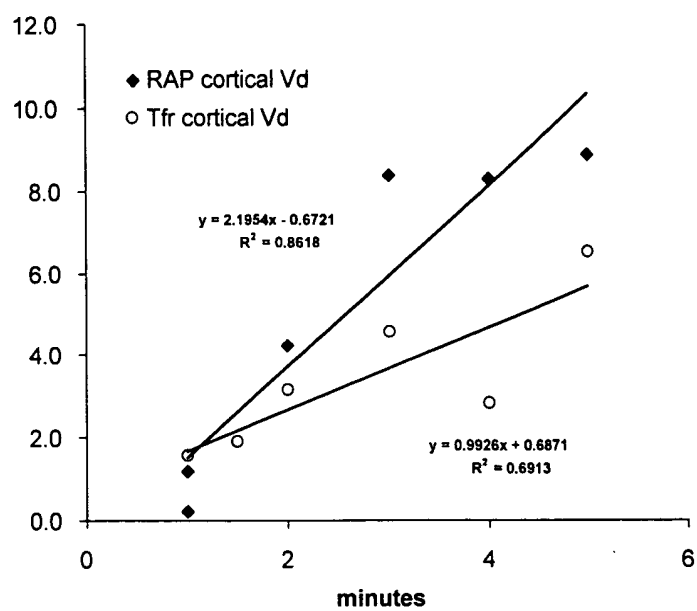
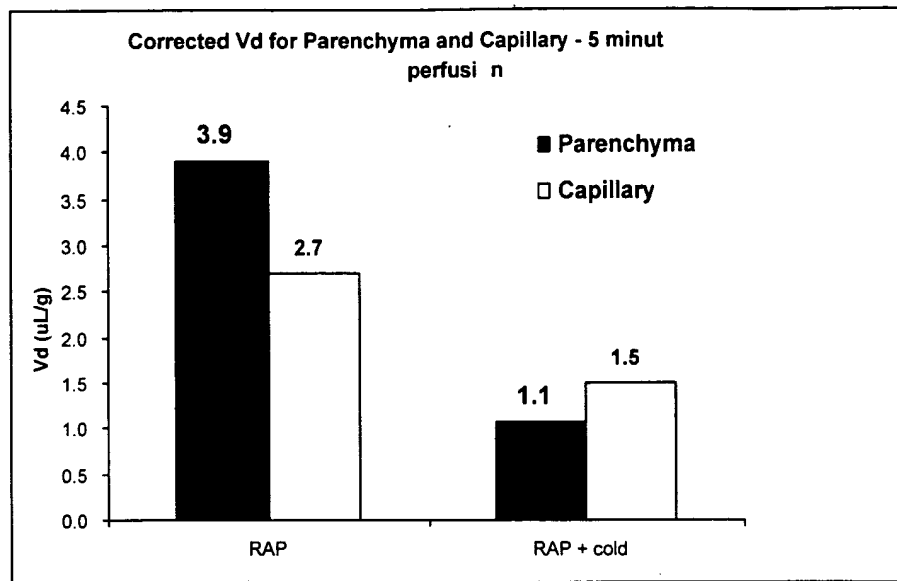
	None	RAP	RAP-Idu (Purified)	RAP-Idu (Medium)
Anti-RAP				
Anti-Idu				

FIGURE 10



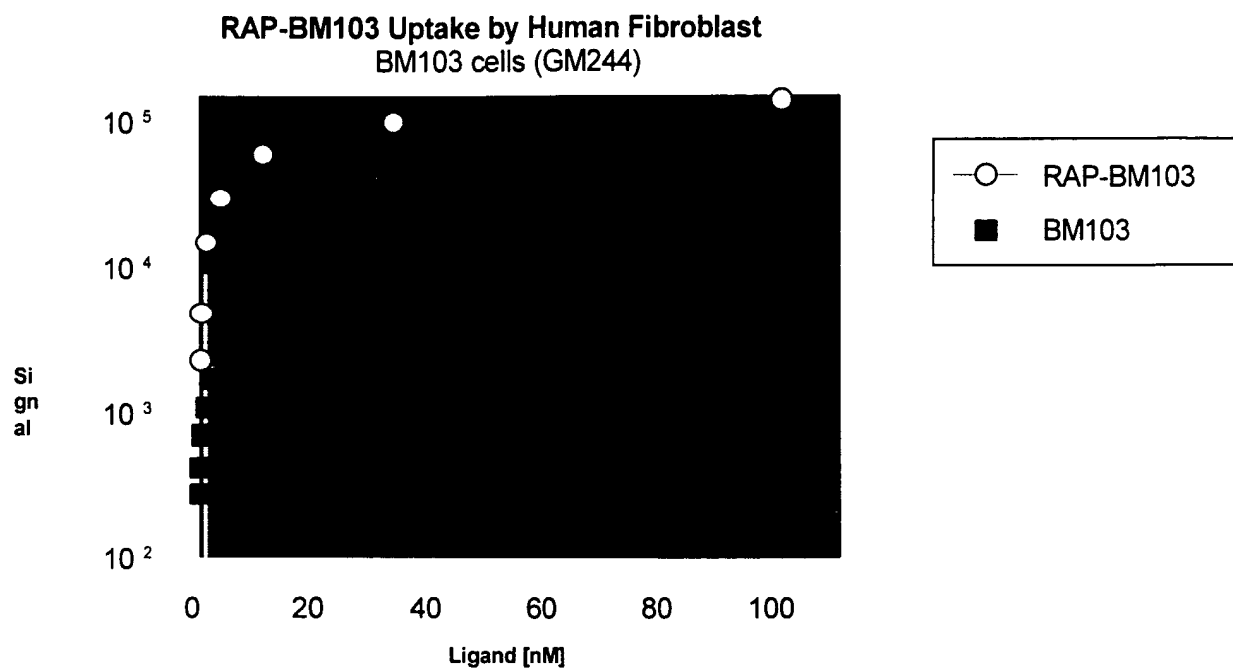
Corrected V<sub>d</sub> vs. Perfusion time.

FIGURE 11.



Distribution of RAP between brain capillary endothelium and brain parenchyma.

FIGURE 12.

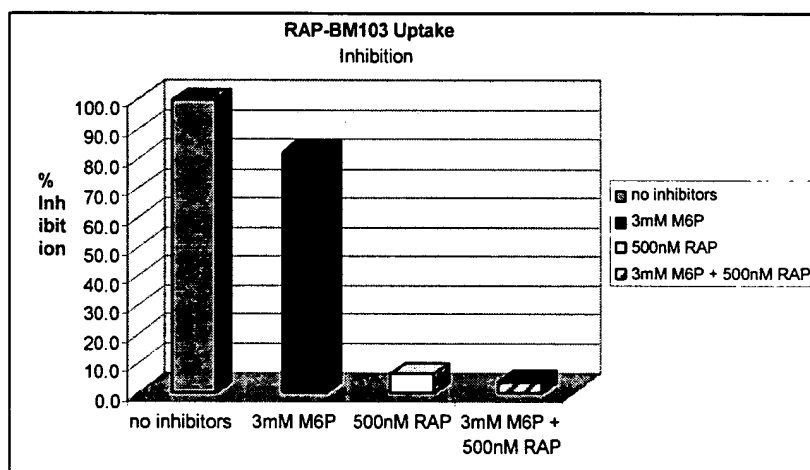


#### RAP-BM103

Parameter	Value	Std. Error
Vmax	160806 .4864	5540 .7619
Km	18 .6316	1 .8955

#### BM103

Parameter	Value	Std. Error
Vmax	2691 .6376	112 .1342
Km	1 .6615	0 .2002



**FIGURE 13**



FIGURE 14. Multiple alignment of amino acid sequences of RAP from different species.

5	human	1	-----MAPRRVRSFLRGLPAALLLILFLGWPWPAASHGGKYSREK
	mouse	1	MGGPTRPSPVSLALQKMAPRRRVSILPRLQLLVLLIPLMLVPQPIAGHGGKYSREK
	rat	1	-----LRDRVSLPRLQLLVLLIPLLLVPQPIAGHGGKYSREK
	chicken	1	-----MGATRTVAVMAAFLAVSTRASKYTRFA
	zebrafish	1	-----MAGKYSKEM
	fruit fly	1	-----MVRSAIVVAAIAISVIALQGVADKKQSKKYSKEA
	mosquito	1	-----ELCPiARRKRGIKHTLTMPLFTRCVIVFTVLVCNHVVQSENAHSKY
10	flatworm	1	-----MRNHFFLL
	consensus	1	t 1 11 lml hggkysre
15	human	40	-----NQPKPSPKHESGEFFRMEKLNQIWEKAQRHLHPVRLAELHSDLKIQRDE
	mouse	61	-----NEPEMAAKRESGEFFRMEKLNQIWEKAQRHLHSPVRLAELHSDLKIQRDE
	rat	40	-----NEPEMAAKRESGEFFRMEKLNQIWEKAQRHLHSPVRLAELHSDLKIQRDE
	chicken	29	-----NEGLADAKPREAGEFRVYRLNQVWEKAQRLOLSAVKLAELHSDLKIQEKDE
	zebrafish	10	-----NEKNASDKSNNQVEFRITAKLNOVWEKAIRMOIAPVRLSELHSDLKIQEKDE
20	fruit fly	37	NDPHFQQVKQEKYDPPDFSIQRPFRMAKLNLVAKAQNRLTEPRKLSHYMELKIHDKEE
	mosquito	48	SKHANALPDSIYEPDFNIQRPFRMAKLNLVTKAQRRLTEPRKLSHYTELKIHDKEE
	flatworm	10	-----FLLVIGSAHNKKTQYATRELFYFEKALQHVTDQRNLRLEKISGYDAIY
	consensus	61	ne kr g efRmeklNqvwEKaql lspvrLaeLhsdLkigekde
25	human	91	IAWKKLKLEGLDEGEKEAKLIIRNLNVILAKYGLDGKNDARQVTSN-----SLSGTOE--
	mouse	112	LNWKKLKVEGLDKGEKEAKLIIRNLNVILARYGLDGRKDAQMVHSN-----ALNEDTQ--
	rat	91	LNWKKLKVEGLDKGEKEAKLIIRNLNVILARYGLDGRKDTQTVHSN-----ALNEDTQ--
	chicken	80	LSHKKLKAEGLGEGEKEAKLRRNINVTIKYGMNKKDSHLTDIN-----YIKDGTES--
	zebrafish	61	LNWKKLKAEGLGEGEKEAKLRRNINILAKYGMNKKLRTITDSNR-----LKDHEVKIG--
30	fruit fly	96	IAWKQLNSQHKIKGGLNADELRRKIGIMSSDLEHFDTQDTEKLKPKYKFHLAE--R
	mosquito	107	ITYKQLK--EKIKGGLKEAELNKKVSIMSTIGILEHFDTQDPEKYKLAKSSDGAPKDD
	flatworm	61	LASKSNR--QGTOGTKEIDSIDDKGKIEKYGLKAVLAFKEKYKHNLFQQTDDN--P
	consensus	121	l wKklk egld dgekeaklrrnlvnlakYgldgkdd v sn 1 e e
35	human	144	-----GLDPPRLEKLWHKAKTSGKFSGEELDKLWREFLHHKEKIHEYNNLLETLS---
	mouse	165	-----ELGDPRLLEKLWHKAKTSGKFSSEELDKLWREFLHYKEKIQEYNNLLETLS---
	rat	144	-----ELGDPRLLEKLWHKAKTSGKFSSEELDKLWREFLHYKEKIHEYNNLLETLS---
	chicken	134	-----TLDDPRLEKLWSKAKTSGKFSDEELDKLWREFLHHKEKIREYNNLLETLS---
40	zebrafish	117	-----LTFDDPRLEKLWNKAKTSGKFSDEELQTLHREFQHHKDKIHEYNTVMDTV---
	fruit fly	155	-HRNKSLFKKKLNKLWEKAETIG--ETAEELKSLKQEFDDHHQDNVDVYSILENIG---
	mosquito	165	TYKNKSLFKKKLNKLWKAESA--ETKEELDAIREEDHHQAKIDVYSILERI--GDDDD
	flatworm	118	--LPSGKFTQNLKLWSSQONGK--FQKEIQAHHGHLKEVEQKRVVEDQDDDFK---
45	consensus	181	d DprLekLW kAktsgkFs eELdkLwrEf hhkeKiheYnvlletls
50	human	195	-----ETEEIHENMLSPSDLS-----DIKGSVLSHKHTTELKEKL
	mouse	216	-----PAEEGYENMLSPSDMA-----HIKSDTLISKHSELKDRI
	rat	195	-----PAEEGYENMLSPSDMT-----HIKSDTLASKHSELKDRI
55	chicken	185	-----ETEDIHKVYNPSEEN-----PVKEEVHNNKRELKEKI
	zebrafish	168	-----ETEEIHKVISHLEG-----DVKENVHOKHTDLKQRM
	fruit fly	209	-----TVDTKIHENAITE--LDTYNLISNDVNENDIKTHAQNVSFENDLNT--RGHH
	mosquito	224	GGAAGQGSRRDDALLSAYNDEEHDRYNEVDRAEETDRSQPGANKQAHAYLHNSNOLREKH
	flatworm	171	-----K--VPHENS--QHDIES-----IG-----DNTKKLKAAN
55	consensus	241	r ee henvispsdl ik 1 khteLkekl

human	229	RSINQGLDRLRKVSHQGYSTEA	LFEEPRVIDLWDLAQSA	MLIDKELEA	REELKHFEAK
mouse	250	RSINQGLDRLRKVSHQGYG	TTEFEEPRVIDLWDLAQSA	NFTEKELESF	REELKHFEAK
rat	229	RSINQGLDRLRKVSHQGYG	PAFEEPRVIDLWDLAQSA	NFTEKELESF	REELKHFEAK
chicken	219	RSINQGFERLKKVSHQGYD	ATSEFEEPRVIDLW	MAKSA	NFTEKELESF
5 zebrafish	201	FDLNOGFERLKKITHE	GYTDDSEFEEPRVIDL	EMAKRS	LSFDELDLKEELRHFFTK
fruit fly	261	TGDKHYDRLERLVSS	PHQDIEIKVQGLERVA	AS	NFTVKELESIKTELHFFSR
mosquito	284	REIRDNEDRIDRIASK	PKQDEVEIKVQGLERVA	AS	DSADEIASLKVLELLEYSE
flatworm	197	REINDHLEEVHRKVTSE	EFEP	ENEPRVKRLKLAQ	ENEKLIPHEISVLKDELSHFESQ
consensus	301	rsinqgldrlrrvshqgy	s teFeEPrVidLWdlAqsa	nftekELesfreELkhfEak	
10 human	288	IEKHNHYQKOLEISH	HEKLKHVES	-----	VGDGERVSRSR
mouse	309	IEKHNHYQKOLEISH	OKLKHVES	-----	IGDPEHISR
rat	288	IEKHNHYQKOLEISH	OKLKHVES	-----	IGDPEHISR
chicken	278	IEKHNHYQKOLEISH	HEKLKHVES	-----	TGDKHEHNR
15 zebrafish	260	VEKHQHYQOLEISH	OKLKHVES	-----	LGDEDHLMRN
fruit fly	319	LLKLRLHAEHAL	QREKYNGEK	-----	VKDKSSREEMEDQL
mosquito	342	LLKLRLHAEHAL	QREKYNGEK	-----	DAKADTHKL
flatworm	255	EKKIEFHKVFFV	ANSCPRGKNEEVSR	LOQ	DAEERGKDKSQVYENLELSIKHE
consensus	361	ieKhnhyqkqleisheklkhve			vgd ehv rnreky lleektkelgykvkchl
20 human	343	QDLSSRIS	SR	ARHNEL	
mouse	364	QDLSSRIS	SR	ARHNEL	
rat	343	QDLSSRIS	SR	ARHNEL	
25 chicken	333	QDLSSRIS	OG	LQHNEL	
zebrafish	315	QDLTNKLS	ANGLOHNEL		
fruit fly	367	ENIEKT	IFK	HTEL	
mosquito	388	EEVERR	IFK	HSEL	
flatworm	315	RKLEKY	EEKIIHREL		
30 consensus	421	qdlss risr		HnEL	

**Figure 15: Amino Acid Sequence Of Human RAP (SEQ ID NO:1)**

TyrSerArgGluLysAsnGlnProLysProSerProLysArgGluSer  
GlyGluGluPheArgMetGluLysLeuAsnGlnLeuTrpGluLysAla  
GlnArgLeuHisLeuProProValArgLeuAlaGluLeuHisAlaAsp  
LeuLysIleGlnGluArgAspGluLeuAlaTrpLysLysLeuLysLeu  
AspGlyLeuAspGluAspGlyGluLysGluAlaArgLeuIleArgAsn  
LeuAsnValIleLeuAlaLysTyrGlyLeuAspGlyLysLysAspAla  
ArgGlnValThrSerAsnSerLeuSerGlyThrGlnGluAspGlyLeu  
AspAspProArgLeuGluLysLeuTrpHisLysAlaLysThrSerGly  
LysPheSerGlyGluGluLeuAspLysLeuTrpArgGluPheLeuHis  
HisLysGluLysValHisGluTyrAsnValLeuLeuGluThrLeuSer  
ArgThrGluGluIleHisGluAsnValIleSerProSerAspLeuSer  
AspIleLysGlySerValLeuHisSerArgHisThrGluLeuLysGlu  
LysLeuArgSerIleAsnGlnGlyLeuAspArgLeuArgArgValSer  
HisGlnGlyTyrSerThrGluAlaGluPheGluGluProArgValIle  
AspLeuTrpAspLeuAlaGlnSerAlaAsnLeuThrAspLysGluLeu  
GluAlaPheArgGluGluLeuLysHisPheGluAlaLysIleGluLys  
HisAsnHisTyrGlnLysGlnLeuGluIleAlaHisGluLysLeuArg  
HisAlaGluSerValGlyAspGlyGluArgValSerArgSerArgGlu  
LysHisAlaLeuLeuGluGlyArgThrLysGluLeuGlyTyrThrVal  
LysLysHisLeuGlnAspLeuSerGlyArgIleSerArgAlaArgHis  
AsnGluLeu

**Figure 16: Amino Acid Sequence of the 28 kD RAP polypeptide (SEQ ID NO:2)**

ProArgLeuGluLysLeuTrpHisLysAlaLysThrSerGlyLysPhe  
SerGlyGluGluLeuAspLysLeuTrpArgGluPheLeuHisHisLys  
GluLysValHisGluTyrAsnValLeuLeuGluThrLeuSerArgThr  
GluGluIleHisGluAsnValIleSerProSerAspLeuSerAspIle  
LysGlySerValLeuHisSerArgHisThrGluLeuLysGluLysLeu  
ArgSerIleAsnGlnGlyLeuAspArgLeuArgArgValSerHisGln  
GlyTyrSerThrGluAlaGluPheGluGluProArgValIleAspLeu  
TrpAspLeuAlaGlnSerAlaAsnLeuThrAspLysGluLeuGluAla  
PheArgGluGluLeuLysHisPheGluAlaLysIleGluLysHisAsn  
HisTyrGlnLysGlnLeuGluIleAlaHisGluLysLeuArgHisAla  
GluSerValGlyAspGlyGluArgValSerArgSerArgGluLysHis  
AlaLeuLeuGluGlyArgThrLysGluLeuGlyTyrThrValLysLys  
HisLeuGlnAspLeuSerGlyArgIleSerArgAlaArgHisAsnGlu  
Leu